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ABSTRACT

The devices listed in this reference circular are designed to assist people with visual or physical disabilities to access information displayed on a computer screen. These devices include screen magnifiers, screen readers, web browsers, and devices that convert print into synthetic speech or braille. Section 1 lists available products. Section 2 gives the addresses and telephone numbers of the producers and vendors and Section 3 provides a selective list of 36 books and journal articles that evaluate specific devices. Also included are 16 Internet resources on assistive technology. (DB)

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Assistive Devices for Use with Personal Computers



**National Library Service
for the Blind and
Physically Handicapped**

The Library of Congress

Washington, DC 20542

Date **January 1998**

No. **98-01**

Introduction

The devices listed in this reference circular are designed to assist people who have visual or physical disabilities to access information displayed on a computer screen. The information includes screen magnifiers, screen readers, web browsers, and other devices that convert print into synthetic speech or braille. Section I lists available products, Section II gives the addresses and telephone numbers of the producers and vendors, and Section III is a selective list of books and journal articles that evaluate specific devices. Because prices are subject to change without notice, contact companies directly to verify current prices and product specifications.

Items listed in this reference circular are not part of the National Library Service for the Blind and Physically Handicapped program, and their listing does not imply endorsement.

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Screen Magnifiers

Screen magnifiers display the information on a computer screen in a variety of magnifications and fonts. They may be software or hardware based. The software programs are compatible with many word-processing, database, and spreadsheet applications. The hardware is available in several models that are compatible with most computers.

Hardware

Big Mag Swivel Screen Enlarger

Magnifies up to 2x; fits 14" to 20" monitors. Adjustable free-standing unit with swivel-mount base.

Ann Morris, CSC1, \$49.95

LS&S, CTC-20C, \$49.95

Compu-Lenz (Florida New Concepts)

Uses a Fresnel lens to enlarge character size up to 4x and reduces glare on the screen. Attaches to a personal computer.

Carolyn's, CL16A, \$167.95; swivel mount, \$22.95

Florida New Concepts Marketing, CL-16A, \$204.95; swivel mount, \$20.95

Independent Living Aids, 185320, \$169.95; swivel mount, \$19.95

LS&S, CL-16, \$189.95; swivel mount, \$20.95

Maxi-Aids, 07096, \$189.95; swivel mount, \$25.95

Science Products, A8053, \$245; swivel mount, \$32.50

Visual-Tech Connection, \$199.95; swivel mount, \$19.95

Computer Magnifier Screen

Enlarges the information by 50 percent.

Maxi-Aids, CTC-17A, \$114.95; CTC-17N, \$119.95

LS&S, CTC-17A, \$119.95

Computer Screen Magnifier

Attaches with removable hook-and-loop strap to computer monitors with 12" to 15" screens; increases any on-screen image from 14" to 17".

Sammons Preston, A4210, \$162.95

EZ Magnifier (Less Gauss)

Has approximately 2x magnification. Attaches to a monitor up to 17" with Velcro or Bungee.

Carolyn's, EZMAG, \$194.95

Less Gauss, \$198

LS&S, EZ-MAG, \$194.95

Fresnel Magnifier with Base

Magnifies at 2x. Adjustable 8" x 10" Fresnel lens can be adjusted to sit in front of a computer screen.

Carolyn's, T100, \$49.95

Magni-Filter

Enlarges characters 2x. Cuts glare by 99 percent and ELF/VLF emissions by 99.99 percent. Fits laptop through 21" screen; price varies according to screen size.

LS&S, \$99, \$149, \$199, \$329

Maxi-Aids, \$149, \$189.95, \$299.95

NuVu GNK Magnifier (Less Gauss)

Provides up to 3x magnification on monitors from 12" to 19". Lens is mounted on an oak base.

Carolyn's, GNK, \$269

Less Gauss, \$269

Maxi-Aids, 38-007, \$269

NuVu Screen Magnifier (Less Gauss)

Magnifies approximately 2x and is adjustable. Fits monitors up to 17".

Carolyn's, NUVU, \$149.95

Less Gauss, \$149

LS&S, NUVU, \$149

Reizen Computer Magnifier Screen

Fits 14" to 20" monitors, expands the CRT picture by 50 percent.

Maxi-Aids, 28220, \$44.95

Super Vista (Telesensory)

Uses a hardware-based zooming engine to enlarge text and graphic information on the computer screen up to 16x.

Independent Living Aids, 724490, \$2,495

Telesensory, SF5A, \$2,495; software available for free download from website

WYNIWYG Laptop Visual Enhancement System (Less Gauss)

Magnifies 2.2x, compact hood that folds flat fits over monitor to reduce glare.

Carolyn's, LVE, \$86.95

Less Gauss, \$98

LS&S, LVE, \$99.95

Maxi-Aids, 38-218, \$98

Software

Artic MAGNUM

Enlarges Windows 95 and 3.1 from 1x to 32x, enlarges DOS text from 1x to 8x.

Arkenstone, \$995

Artic Technologies, \$595

C Tech, \$495

Missing Link Technologies, \$295, \$495

B-Edit (Hexagon)

A text-editor program that magnifies up to 5x and functions with any standard graphics display card and monitor (CGA, EGA, VGA).

Hexagon Products, \$39

National Institute for Rehabilitation Engineering, \$39.95

Big-W (Hexagon)

Runs from the Windows program manager to open up a magnifying window. By default, it uses a magnification factor of three, but it can be resized or repositioned with standard Windows's commands.

Hexagon Products, \$39

National Institute for Rehabilitation Engineering, \$39.95

Eye Relief (SkiSoft)

Runs on any IBM-compatible desktop PC with 512K RAM and a graphics screen. Screen fonts can magnify up to 5x. User can create, edit, and print standard ASCII text files.

Bossert Specialties, ER-1, \$289
Carolyn's, ER, \$295
HumanWare, ERS-1, \$295
LS&S, 281-ERWP, \$295
SkiSoft Publishing Corporation, \$295

IBM Screen Magnifier/2

Enlarges text and images from 2x to 32x. For use with DOS, OS/2, or Windows.

Carolyn's, IBMSM2, \$495
Electronic Visual Aid Specialists, EVAS-2IBM-670, \$495
International Business Machines, \$495
LS&S, 71G0670, \$495
Maxi-Aids, PM-2, \$489.95
Missing Link Technologies, \$495

inLARGE (ALVA Access Group)

Magnifies the entire screen of a Macintosh or a portion of text or graphics 2x to 16x.

ALVA Access Group, \$295
C Tech, \$195
Carolyn's, BINI, \$195
Electronic Visual Aid Specialists, EVAS-2BS-IL, \$195
Independent Living Aids, 385257, \$195
LS&S, IL20, \$195
Maxi-Aids, BS-02058-IL, \$189.95
Missing Link Technologies, \$195
Technologies for the Visually Impaired, \$185

LP-DOS and LP-Windows (Optelec)

Has three versions: DOS, Windows, or Deluxe (DOS and Windows).
Magnifies text and graphics from 2x to 16x.

C Tech, \$395; \$395; combination, \$595
Carolyn's, LPWIN, \$385; LPDOS, \$395; LPDX, \$585
Electronic Visual Aid Specialists, EVAS-20PT-LPDD (Deluxe), \$595

HEDJ Group, DOS, \$495; Deluxe, \$595
LS&S, LPDOS, \$495; DELUXE-LPDOS, \$595
Maxi-Aids, VW9595WN, \$395; VW3500LP, \$395; VW3500DL,
\$595
Optelec, DOS, \$395; Windows, \$395; Deluxe, \$595
Personal Data Systems, Deluxe, \$595
Reading Technology, Deluxe, \$595
Technologies for the Visually Impaired, Deluxe, \$575

MAGic (Henter-Joyce)

Magnifies DOS programs 2x to 12x and Windows programs 2x to 8x.
Provides 2x graphics magnification in DOS. Features include bookmarking,
smooth panning, and screen location display.

Acrontech International, \$349
Bossert Specialties, \$349
C Tech, \$295
Carolyn's, MAGDX, \$349
Electronic Visual Aid Specialists, EVAS-2MSI-M2, \$349
Independent Living Aids, 453790, \$349
Henter-Joyce, \$349
LS&S, MAGIC-DELUXE, \$349
Maxi-Aids, MS-4699-DM, call for price
Technologies for the Visually Impaired, \$345

MAGic NT (Henter-Joyce)

Makes all the MAGic for Windows features available for Windows NT
platform.

Carolyn's, MAGNT, \$995
Electronic Visual Aid Specialists, EVAS-2MSI-M5, \$995
Henter-Joyce, \$995
Independent Living Aids, 453810, \$995
LS&S, MAGIC-NT, \$995
Maxi-Aids, SW-1010, \$995
Technologies for the Visually Impaired, \$985

Magnerifik

Works with Windows programs on an IBM PC, notebook, or compatible computer and a VGA monitor. Magnifies 1x, 2x, 4x, and 8x. Can invert the color contrast between black and white.

MYNA Corporation, \$199

MAGNUM

See: Artic **MAGNUM**

Panorama and Powerama (Syntha-voice Computers)

Magnifies text and graphics from 2x to 10x on IBM-based systems furnished with 384k extended memory and either an EGA or VGA video card.

Powerama can synchronize all synthetic speech and large-print commands so a user can both see and listen to the text that is on the computer screen.

Carolyn's, SPOW, \$495; SPOWWIN (Windows), \$695

Syntha-voice Computers, \$495, \$795

ProVision32 (Biolink)

Works in Windows NT. Magnifies from 2x to 16x.

Biolink Computer Research, \$1,095

Electronic Visual Aid Specialists, EVAS-2BL-PV32, \$1,095

VisAbility (Ai Squared)

Magnifies 1x to 32x and prints at magnifications up to 8x. Can display the image full-screen or in a window.

Ai Squared, \$495

Arkenstone, \$495

Bossert Specialists, \$495

Carolyn's, VIS, \$495

Electronic Visual Aid Specialists, EVAS-2ZOOM-V, \$495

HEDJ Group, \$495

Independent Living Aids, 831159, \$495

LS&S, \$495

Missing Link Technologies, \$495

Optelec, \$495

Personal Data Systems, \$495

Reading Technology, \$495

Sighted Electronics, Z002, \$495

ZoomText and ZoomText Xtra (Ai Squared)

Available in a DOS and Windows version that magnifies from 2x to 16x in a variety of fonts. ZoomText Xtra, which was released in September 1997, replaces ZoomText Plus and ZoomText for Windows; it includes a software-generated speech module called DocReader.

Ai Squared, \$395, \$595, \$795

Arkenstone, call for pricing

C Tech, \$395, \$595

Carolyn's, ZTDOS, \$395; ZTWIN, \$385; ZPLUS, \$585

Electronic Visual Aid Specialists, ZT1, \$395; ZTD1, \$595

Enabling Technologies, \$495, \$595

Exceptional Teaching Aids, ZT1, \$395; ZTD1, \$595

HEDJ Group, \$395, \$595

HumanWare, ZT, \$395; ZTW, \$395; ZT+, \$595

Independent Living Aids, 870100, \$395; 870146, \$595

LS&S, ZT-DOS, \$395; ZT-WIN, \$395; ZT-PLUS, \$585

Maxi-Aids, ZOM-1463-TX, \$395; ZOM-1464-TX, \$395; A1-9134-PL, \$595

Missing Link Technologies, DOS, \$395; Windows, \$395; Plus, \$595

Personal Data Systems, \$595

Reading Technology, \$595

Sighted Electronics, Z001, \$595

Technologies for the Visually Impaired, \$575

Screen Readers

Screen readers are software packages that interact with refreshable braille displays or speech synthesizers. They enable individuals who are blind or visually impaired to access the information on the computer screen either through braille or by voice output. Most of the readers can be used with a range of commercially available text-to-speech synthesizers. Some can also be used with Sound Blaster compatible sound cards.

AppleWorks Companion (RC Systems)

Modifies AppleWorks Startup software by adding speech and new function commands. Requires the DoubleTalk or Slotbuster II speech synthesizer option and AppleWorks 2.0 or higher. Does not work with the Echo or Cricket synthesizers.

Carolyn's, RCAW, \$49.95

LS&S, SB0202, \$49.95

RC Systems, SW0202, \$49.95

Artic Business Vision

Provides access to DOS programs. Processes all keyboard input and screen output into speech and is interactive with spreadsheet programs. Consists of a speech board and screen access software.

Artic Technologies, \$395

Missing Link Technologies, \$495

Artic WinVision 97

Works with Windows 95 and 3.1. Can be used with or without any brand of DOS screen access. Supports a variety of synthesizers.

Artic Technologies, \$595

C Tech, \$495, \$595

Missing Link Technologies, \$495

ASAP and ASAW (MicroTalk)

Has two versions: **Automatic Screen Access Program (ASAP)** for DOS computers and **Automatic Screen Access for Windows (ASAW)** for Windows 3.1, 95, and Windows for Workgroups. Determines the appropriate text to speak by analyzing information in the display memory and responding to user input commands.

Ann Morris Enterprises, CAS1, \$525; CAS6, \$595

Blazie Engineering, ASAP, \$595; ASAW, \$595
 Carolyn's, ASAP, \$525; ASAW, \$595
 Electronic Visual Aid Specialists, EVAS-3MT-ASAP, \$525; EVAS-3MT-ASAW, \$595; EVAS-3MT-ASAC (combination), \$920
 Exceptional Teaching Aids, ASAP1, \$525; ASAW1, \$595; combination, \$920
 HEDJ Group, \$525; \$595; combination, \$920
 Independent Living Aids, 082965, \$525; 082975, \$595
 LS&S, ASAP-SOF, \$525; ASAW, \$595; ASAW-ASAP, \$920
 Maxi-Aids, ASAP, \$525; WINASAW, \$595; combination, \$920
 MicroTalk, ASAP, \$525; ASAW, \$595; combination, \$920
 Missing Link Technologies, \$595; \$595; combination, \$920
 Raised Dot Computing, \$525; \$595; combination, \$920
 Technologies for the Visually Impaired, \$500; \$575; combination, \$920

IBM Screen Reader

Has DOS and OS/2 versions that are compatible with many personal computer applications and support a range of commercially available text-to-speech synthesizers. **Screen Reader/2** requires OS/2 2.1 or higher and converts IBM's Graphical User Interface to speech.

Blazie Engineering, IBM-SRII for PS II, \$648; IBM-SR for IBM PC and clones, \$721; IBM-OS for OS/2, \$723
 Carolyn's, 2261648 DOS, \$500; 2261649 OS2, \$600
 Electronic Visual Aid Specialists, EVAS-3IBM-648, \$500; EVAS-3IBM-317, \$600; EVAS-3IBM-988 (Screen Reader/2), \$599
 International Business Machines, \$500-\$699
 LS&S, 2261648, \$500; 2261649, \$600
 Maxi-Aids, IBM-226164 (DOS), \$489.95; IBM-2261649, \$589.95
 Missing Link Technologies, \$500, \$600
 Personal Data Systems, DOS, \$600; Reader/2, \$700
 Technologies for the Visually Impaired, \$475, \$575
 Telesensory, 91500-213, \$648; 91500-214, \$721

JAWS (Job Access With Speech) (Henter-Joyce)

Has versions for use with any DOS application, for Windows 3.1 or 3.11, and for Windows 95 and Windows NT. Offers a dual-cursor design that allows a user to read the screen with the JAWS cursor and have the PC cursor ready to communicate with the application program.

Arkenstone, DOS, \$495; Windows, \$795; bundle, \$990
 Blazie Engineering, JAWS, \$495; JFW, \$795; JAWS-COMBO, \$990
 C Tech, \$495; \$795; combination, \$990
 Carolyn's, JAWS, \$495; JAWSW, \$795
 Electronic Visual Aid Specialists, EVAS-3JAWS-A, \$495; EVAS-3JAWS-W (Windows), \$795; EVAS-3JAWS-C (combination), \$990
 HEDJ Group, \$495; \$795; combination, \$990
 Henter-Joyce; \$495; \$795, \$1495
 HumanWare, JAWS (Windows), \$795
 LS&S, J2, \$495; JFW, \$795; combination, \$995
 Maxi-Aids, 23700, \$495; JFW, \$795; JFWCM, \$995
 Missing Link Technologies, \$495; \$795; combination, \$990
 Personal Data Systems, Windows, \$795
 Sighted Electronics, J004 (DOS), \$495; J001, \$795; J005, \$995
 Technologies for the Visually Impaired, \$495; \$795; combination, \$950
 Telesensory, JW1A (Windows), \$795

MasterTouch (HumanWare)

For DOS applications. Allows the user to monitor all or selected screen changes as they occur without the need to suspend the application to review the screen.

HumanWare, KN2200, \$495

outSPOKEN (ALVA Access Group)

Has two versions: **Macintosh** uses an internal speech synthesizer to provide speech output; **Windows** converts the graphics and text of Windows to a full speech and audio interface.

ALVA Access Group, \$495; \$695
 Blazie Engineering, OUTSP-MAC, \$595; OUTSP-WIN, \$595
 C Tech, \$695 (Windows)
 Carolyn's, BOS, \$495; BOSW, \$595
 Electronic Visual Aid Specialists, EVAS-3BS-OS (Macintosh), \$495; EVAS-3BS-OSWIN (Windows), \$595
 HumanWare, OSW1.2 (Windows), \$695
 Independent Living Aids, 567159, \$495
 LS&S, OS17, \$495; OS-WIN (Windows), \$295
 Maxi-Aids, BS-61516-OS, \$479.95; BS-Win, \$595

Missing Link Technologies, \$495

Technologies for the Visually Impaired, Mac, \$475; Windows, \$570

Telesensory, RZ4A, \$395

Protalk32 (Biolink)

Has two versions: one provides access to Windows 3.1, 3.11, or 95, the other to Windows NT 3.5 or newer. Supports braille and/or speech.

Biolink Computer Research, \$995; Windows NT, \$2,495

Electronic Visual Aid Specialists, EVAS-3BL-PT3295 (Windows 95), \$995; EVAS-3BL-PT32NT (Windows NT), \$2,495

Maxi-Aids, \$995; P32 for NT, \$2,495

SCAT (Screen Articulator) (RC Systems)

For the Apple II. Requires Slotbuster II multifunction card with speech synthesizer option or DoubleTalk speech synthesizer card.

RC Systems, SW0200, \$19.95; SW0201, \$34.95

ScreenPower (Telesensory)

Has two versions: **ScreenPower Speech** operates with a variety of speech synthesizers in DOS applications; can download free from Telesensory's website at <http://www.telesensory.com>, but downloaded software does not include diskettes, manuals, or technical support. **ScreenPower for Windows 95** works in Windows 95, 3.1, and 3.11 and supports standard braille functions and advanced features such as split-display mode.

C Tech, DOS, \$495; Windows, \$995

Electronic Visual Aid Specialists, 3TC-SP1A, \$299; 3TC-SD1U (DECTalk), \$299; 3TC-SW2A (Windows), \$1,195

Missing Link Technologies, \$499; Windows, \$995

Technologies for the Visually Impaired, DOS, \$495; Windows, \$995

Telesensory, SP1A, \$299; SD1U (software for DEC synthesizers), \$299; SW2A (Windows), \$1,195

Slimware and Slimware Window Bridge (Syntha-voice Computers)

Requires IBM-based systems with DOS 3.3 or higher and supports more than thirty-five speech synthesizers and more than twenty models of braille displays. **Window Bridge** works in both DOS and Windows 3.1, 95, and Windows for Work Groups with a single set of commands.

Carolyn's, SWB, \$595

Electronic Visual Aid Specialists, EVAS-3SV-WB9, \$695

HumanWare, \$695
LS&S, SW-WIN, \$695
Missing Link Technologies, \$395, \$695
Syntha-voice Computers, \$395, \$695
Technologies for the Visually Impaired, \$570

Tinytalk Personal (OMS Development)

For IBM-compatible computers. Uses very little memory. Supports some inexpensive speech synthesizers and the 43- and 50-line screen displays that are available with EGA and VGA video cards.

OMS Development, \$150

Vocal-Eyes and Window-Eyes (GW Micro)

Vocal-Eyes runs on all IBM and IBM-compatible computers and can be used with virtually any commercially available voice synthesizer. **Window-Eyes** incorporates the design of Vocal-Eyes to work with Windows 3.1 or 3.11 or Windows for Workgroups 3.11.

Arkenstone, DOS, \$450; Windows, \$495; bundle, \$795

Blazie Engineering, VOCAL-E, \$450; WINDOW-E, \$495;
combination, \$795

C Tech, \$450; Windows, \$495; combination, \$795

Carolyn's, GW8210004, \$435

Electronic Visual Aid Specialists, EVAS-3GWM-82104, \$450; EVAS-
3GWM-82127 (Window-Eyes), \$495; combination, \$795

GW Micro, 8210-004, \$450; 8210-027, \$495

HEDJ Group, \$450; \$495; combination, \$795

Independent Living Aids, 835125, \$450; 835365, \$495

LS&S, 8210-004, \$429; 8210-027, \$495; combination, \$795

Maxi-Aids, GW-8210-004 (DOS), \$429; GW-8210-027, \$495; GW-
8210-028 (combination), \$795

Missing Link Technologies, \$450, \$495

Personal Data Systems, \$450; \$495; combination, \$795

Raised Dot Computing, \$435; \$480; combination, \$770

Reading Technology, DOS, \$450; \$495; combination, \$795

Sighted Electronics, G001, \$450; G002, \$495; G003, \$795

Technologies for the Visually Impaired, \$425; \$465; combination,
\$750

Window Bridge

See: **Slimware**

Window-Eyes

See: **Vocal-Eyes** and **Window-Eyes**

Windows Master (Blazie Engineering)

Converts icons, windows, and other imaging displays to produce speech or braille. Provides support for all standard Windows's controls.

Blazie Engineering, WDMAST, \$495

LS&S, WDMAST, \$495

WinVision

See: **Artic WinVision 97**

Speech Synthesizers

Speech synthesizers provide voice output of the information on a computer screen, converting standard ASCII text into intelligible speech. When used with screen access programs, speech synthesizers allow users to access any portion of the screen's information. Synthesizers may be either internal or external and can be used with a variety of screen-reader software programs. Different synthesizers are compatible with different computers, feature male and female voices with adjustable tone and speed, and may speak in foreign languages.

Aicom Accent

Comes in two models: **Accent-PC** is IBM-PC, XT, and AT compatible and **Accent-SA** uses a standard RS-232C serial port for interface with any host computer. Converts ordinary ASCII text into intelligible speech and can speak in the text mode or the spell mode. Please call Aicom for the dealer nearest you.

- Aicom Corporation, \$595, \$795
- Blazie Engineering, PC, \$745; SA, \$995
- Carolyn's, ACCPC, \$745; ACCSA, \$995
- Electronic Visual Aid Specialists, 3AC-PC, \$595; 3AC-SA, \$795
- HEDJ Group, \$595, \$795
- LS&S, PC, \$595; SA, \$795
- Maxi-Aids, PC, \$595; SA, \$795
- Missing Link Technologies, \$795
- Technologies for the Visually Impaired, PC, \$530; SA, \$760

Aicom Messenger-IC

Fits into a laptop or notebook computer with a PCMCIA type II slot.

- Aicom Corporation, \$995
- Blazie Engineering, \$995
- Electronic Visual Aid Specialists, 3AC-MIC, \$795
- HEDJ Group, \$950
- Maxi-Aids, \$985
- Missing Link Technologies, \$995
- Technologies for the Visually Impaired, \$960

Apollo

See: **Dolphin Speech Synthesizers**

Artic SynPhonix

Internal speech card. One model works in Type II PCMCIA slots in portable and desktop computers.

Artic Technologies, \$295; \$495; \$795

Missing Link Technologies, \$495; \$595; \$950

Artic TransPort

Portable external synthesizer. Has serial interface, text-to-speech algorithm, and rechargeable batteries. Can be used with Artic Business Vision or by itself with other screen-access programs.

Artic Technologies, \$795, \$995

Missing Link Technologies, \$895, \$995, \$1,195

Audapter (Personal Data Systems)

Connects to any computer able to send ASCII text over a standard serial or parallel interface. Can be used with talking screen-review programs.

Blazie Engineering, \$895

Carolyn's, PDSAU, \$895

Personal Data Systems, \$895

DECtalk (Digital Equipment)

Translates ASCII text to speech output. Offers a choice of nine voices and adjustable speaking rates for slow spelling to fast scanning. Has controls for pauses, pitch, and syllable accents. **DECtalk Express** is a portable, external synthesizer that plugs into a serial port.

Arkenstone, PC, \$1,195; Express, \$1,195

Artic Technologies, PC, \$1,195; Express, \$1,195

Blazie Engineering, DEC-TLK, \$1,195; DEC-EX, \$1,195

C Tech, \$1,195; \$1,195

Carolyn's, DEC, \$1,095; DECX, \$1,095

Digital Equipment Corporation, \$1,195

Electronic Visual Aid Specialists, 3DEC-PC, \$1,195; 3DEC-DE, \$1,195

GW Micro, 8110-010, \$1,195; 8110-014 (Express), \$1,195

HEDJ Group, \$950; \$1,000

Henter-Joyce, \$1,195

Independent Living Aids, 240225, \$1,195; 240440, \$1,195
LS&S, call for pricing
Maxi-Aids, PC, \$979; Express, \$979
Missing Link Technologies, \$1,195
Personal Data Systems, \$995, \$1,195
Raised Dot Computing, \$1,050
Reading Technology, \$1,195; \$995 when bundled with OCR software
Sighted Electronics, D001, \$1,132; D002, \$1,132
Technologies for the Visually Impaired, \$995, \$995
Telesensory, SD16010 (PC 2), \$1,199; SX16008 (Express), \$1,199

Dolphin Speech Synthesizers

Comes in three models: **Apollo II** has an internal 4-inch speaker; **PCII** is an internal half-card for 386 and 486 machines and comes with 4-inch external speaker; **Juno** is a battery-powered synthesizer that connects to the serial port of a laptop and comes with a 4-inch external speaker. All models feature six resident voices and adjustable inflection, tone, and speed. Some models can speak up to seven languages.

Electronic Visual Aid Specialists, \$1,195

Reading Technology, call for price

DoubleTalk (RC Systems)

Has a dual synthesizer designed to emulate either the Slotbuster or Echo synthesizer for Apple II computers. The Slotbuster emulator can speak in a male voice. The Echo emulator can speak in a male or female voice.

LS&S, DT1000, \$249.95

RC Systems, DT1000, \$249

DoubleTalk LT and DoubleTalk PC (RC Systems)

Has two versions: **LT** relies on an external serial port connection to a computer and can be used with Apple II, Macintosh, PC, or laptop. **PC** installs in any IBM-compatible computer able to accommodate an 8-bit, 1/2-length cord; supports multiple-speech technologies; and converts English or Spanish text into speech.

Ann Morris, CAS5, \$495; CAS4 (PC), \$299

Arkenstone, LT, \$310; PC, \$289

Blazie Engineering, DBL-TK (PC), \$295

C Tech, LT, \$310; PC, \$295

Carolyn's, DTLT, \$295; DT1010, \$279

Electronic Visual Aid Specialists, 3MT-LT, \$595; 3MT-DT, \$279
 Enabling Technologies, 70SF0303, \$299; 70SF3011, \$320
 Exceptional Teaching Aids, DTLT1, \$320; DTPC1, \$299
 HEDJ Group, \$285, \$300
 Henter-Joyce, LT, \$309; PC, \$299
 LS&S, DT-LT, \$295; DT-PC, \$279
 Maxi-Aids, DT1090, \$294; DT1010, \$289
 Microtalk, LT, \$315; PC, \$299
 Missing Link Technologies, LT, \$320; PC, \$299
 Personal Data Systems, LT, \$310; PC, \$289
 Raised Dot Computing, LT, \$320; PC, \$290
 RC Systems, DT1050, \$305; DT1010, \$299
 Reading Technology, LT, \$310; PC, \$299
 Technologies for the Visually Impaired, LT, \$305; PC, \$280

Echo II

Has a circuit board that plugs into an available slot of an Apple IIe and IIgs and is compatible with most existing software programs.

Carolyn's, ECHOII, \$129.95
 Don Johnston, C57, \$129
 Echo Speech Corporation, \$129.95
 Exceptional Computing, E01, \$119.50
 GW Micro, 8110-006, \$140
 Hartley, \$149.95
 LS&S, ECHO II, \$129.95
 Raised Dot Computing, \$130

Echo LC

Interfaces to the Apple IIc and IIc Plus and the Macintosh LC through the modem port and is compatible with most existing software programs.

Carolyn's, ECHOLC, \$129.95
 Don Johnston, C28, \$129
 Echo Speech Corporation, \$129.95
 Exceptional Computing, E02, \$119.50
 GW Micro, 8110-007, \$150
 Hartley, \$129.95
 LS&S, ECHO-LC, \$159.95
 Maxi-Aids, STE-3221-LC, \$149
 Raised Dot Computing, \$130

Echo PC

A stand-alone synthesizer for IBM-type computers or laptops. Features an on-board microprocessor, a built-in speaker, text-to-speech firmware, serial interface, and a wall-mount transformer.

Carolyn's, ECHOPC, \$129.95
Echo Speech Corporation, \$129.95
GW Micro, 8110-011, \$129.95
LS&S, ECHO-PC, \$129.95
Maxi-Aids, STE-0552-PC, \$127
Reading Technology, \$129

Echo PCII

Offers an IBM PC/compatible plug-in speech output board.

Echo Speech Corporation, \$99.95
Exceptional Computing, E03, \$92
Hartley, \$179.95
Maxi-Aids, STE-9011-PC, \$124.95

Infovox

Connects to a serial port and is available in both male and female voices and in different languages.

Personal Data Systems, \$1,400
Reading Technology, call for information

Juno

See: **Dolphin Speech Synthesizers**

Keynote GOLD (HumanWare)

Has three models: **GOLD SA** is a battery-operated (external) synthesizer that connects to the serial port of any IBM-compatible desktop or notebook computer, **GOLD PC** is an 8-bit ½-card for use in IBM-compatible desktop computers, and **GOLD VoiceCard (PCMCIA)** requires a PCMCIA Type II slot in a laptop or notebook computer.

Electronic Visual Aid Specialists, \$795, \$995, \$1,150, \$1,195
GW Micro, 8110-015 (VoiceCard), \$995
HumanWare, KN-2015 (PC), \$795; KN2020 (external), \$995;
KN2030 (PCMCIA), \$1,150
LS&S, KNG-SA, \$995; KNG-PC, \$795; KNG-VC, \$1,150; KN-
ULTRA-SA, \$1,195

Maxi-Aids, VoiceCard, \$985

Missing Link Technologies, VoiceCard, \$1,075

Personal Data Systems, PCMCIA, \$999

LiteTalk (MicroTalk)

Connects to a computer through the serial or parallel port. Has built-in speaker, internal rechargeable batteries, and is portable.

Blazie Engineering, \$495

Carolyn's, MLT, \$495

HEDJ Group, \$595

LS&S, LT-100, \$595

Maxi-Aids, MI-1212-LT, \$589

MicroTalk, \$595

Messenger-IC

See: **Aicom Messenger-IC**

MultiVoice

A battery-operated version of DECTalk that attaches through a standard RS-232 port. Ten voices (male, female, child, and custom) are available.

Assistive Technology, \$1,200

Maxi-Aids, BC-1600-MV, \$1,250

Reading Technology, \$1,200

PROSE 4000 (Centigram Communications)

A full-size card that fits in IBM PC/XT/AT or compatibles or the PS/2 models 25 and 30. Converts ASCII text to speech in real time. Drives a speaker through an on-board amplifier and provides for external computer communications via RS-232 port.

Centigram Communications Corporation, \$1,750

Slotbuster II (RC Systems)

Multifunction interface card. Compatible with the Apple II, II Plus, IIe, and IIGS. Must be ordered with one or more options: Slotbuster speech synthesizer (\$39.95), parallel print port, serial printer port, modem port.

RC Systems, SB1010, \$149.95

SmarTalk (Automated Functions)

Works with most Windows and DOS screen reading programs. Comes with an accessory kit of one's choice: the notebook accessory includes a 9-volt battery and the desktop accessory includes a parallel interface card.

Automated Functions, \$495; kit, \$30
Blazie Engineering, \$495; kit, \$29.95
Carolyn's, ST01, \$369; kit, \$29.95
Independent Living Aids, 699055, \$495; kit, \$30
LS&S, ST-LPT, \$495; kit, \$29.95
Raised Dot Computing, \$369; kit, \$30
Technologies for the Visually Impaired, \$495

Sound Blaster

Multimedia sound card with Text Assist for speech synthesis. Can connect to a CD-ROM drive to listen to audio CDs and to music on the Internet.

Arkenstone, \$200, \$299
Missing Link Technologies, call for price
Personal Data Systems, \$200, \$400

Sounding Board (GW Micro)

Can be used with virtually any speech program designed to utilize a general-purpose synthesizer. Installs into standard desktop PC-compatible computers.

Blazie Engineering, SDB, \$395
C Tech, \$395
Carolyn's, GW8110001, \$389.95
Electronic Visual Aid Specialists, EVAS-3GWM-81101, \$395
GW Micro, 8110-001, \$395
HEDJ Group, \$395
Independent Living Aids, 699475, \$395
LS&S, AF1000, \$345
Maxi-Aids, GW-8110-001, \$345
Missing Link Technologies, \$395
Technologies for the Visually Impaired, \$335

Speak-Out (GW Micro)

Portable battery-powered external synthesizer with the same features as the Sounding Board. Can be connected to any computer, or other device, with a serial or parallel port.

Blazie Engineering, \$650

Independent Living Aids, 700450, \$650
GW Micro, 8110-009, \$640
HEDJ Group, \$650
LS&S, 8110-009, \$649
Maxi-Aids, GW-8110-009, \$649
Missing Link Technologies, \$650
Personal Data Systems, \$650
Technologies for the Visually Impaired, \$640

SynPhonix

See: **Artic SynPhonix**

TransPort

See: **Artic TransPort**

VoiceCard (PCMCIA)

See: **Keynote GOLD**

Web Browsers for Visually Impaired

pwWebSpeak

Translates the information content on a Web page into speech and a simplified visual display. Operates in Windows 3.1, 3.11, and 95.

Productivity Works, call for pricing

VIPinfoNet

Converts text from Web pages into visual and speech displays that can be customized to a user's needs.

JBliss, B1A, \$250

Braille Interface and Displays

Braille displays provide braille access to the information on a computer screen by converting standard ASCII text into braille. In response to information from the computer, braille is produced on the display by pins that are raised and lowered (refreshed) in combinations to form braille characters. When used with screen access programs, braille displays allow users to access any portion of the screen information. They are commonly available in 20-, 40-, or 80-character braille-cell configurations of six or eight dots each. Some displays are portable and battery-powered.

ALVA Braille Terminal (ABT)

Runs with PC and MS-DOS and, by using a special software program, also with graphical operating systems such as IBM OS/2 and Windows. Available in different models: **ABT320** has a single twenty-character braille line with twenty-three braille cells (three status cells); **ABT340** has one forty-cell braille line with forty-three braille cells (three status cells); **ABT380** has one eighty-cell braille line with eighty-five braille cells (five status cells).

HumanWare, \$3,995-\$11,995

ALVA Delphi series

Consists of three products: **ALVA Delphi 480** is a braille display with eighty cells and an internal multilingual speech synthesizer designed for professional use; **ALVA Delphi 440** is a braille display with forty cells and an internal multi-lingual speech synthesizer suitable for mobile use; and **ALVA Spacepad** is a vertical braille display that can be used as an extension of the ALVA Delphi braille displays.

HumanWare, \$5,395; \$10,495

Braille Lite

Comes in two models: **Braille Lite 18** has an eighteen-cell, refreshable eight-dot braille display and **Braille Lite 40** has a forty-cell, refreshable eight-dot braille display. Both feature serial and parallel ports for interfacing and operate two separate languages if desired.

Blazie Engineering, \$3,395; \$3,595; \$5,495

Enabling Technologies, 70BSLITE, \$3,395; 70BSBLT4, \$5,495

Braille Window Display Terminal (HumanWare)

Has two models: a portable model with forty-five eight-dot cells and a desktop model with eighty-five eight-dot cells. Both models allow users to navigate Windows 95 or 3x.

HumanWare, BW45P, \$5,395; BW85D, \$10,495

brailleOUT for Windows (ALVA Access Group)

Transforms the graphical user interface of Windows into a tactile interface to the ALVA, Navigator, and PowerBraille refreshable braille displays.

Requires use with outSPOKEN for Windows.

Alva Access Group, \$149

HumanWare, \$149

David (Baum)

A notebook computer designed around a 386SL processor. Includes serial and parallel interfaces; a forty-cell, eight-dot braille text display; and a four-braille-cell status/attribute display. Has a memory-resident braille translator that renders screen contents or entire files into grade 2 braille.

Baum, \$15,000

Liber Braille Display (VisuAide)

Gives access to a forty-character window on the computer screen. Offers a complete range of screen-review commands.

VisuAide, \$4,195

PowerBraille (Telesensory)

Comes in different versions: **PowerBraille 40** is a forty-character, eight-dot display for PB40 notebook or desktop computers; **PowerBraille 65** is a sixty-five-character, eight-dot braille display for desktop computers; and **PowerBraille 80** is an eighty-one-character, eight-dot braille display for desktop computers.

Telesensory, \$5,745-\$10,595

SuperBraille (Advanced Access Devices)

Has a built-in forty-cell, eight-dot braille display that supports up to forty-four cells. Comes preinstalled with MS-DOS and Windows operating software.

Advanced Access Devices, \$11,985

Automated Functions, \$11,985

Addresses of Sources

AbleTech Connection

See: Visual-Tech Connection

Access Technologies, Inc.

See: HEDJ Group

Acrontech International, Inc.

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See: Echo Speech Corporation

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Selected Internet Resources on Assistive Technology

Alliance for Technology Access (ATA)

<http://www.ATAccess.org>

Has information on web page design and on adaptive devices and software that enhance access to the World Wide Web for people with disabilities.

Apple Computer, Inc.

<http://www.apple.com/disability>

Describes Macintosh adaptive technology for individuals with disabilities.

Center for Accessible Technology (CAT)

<http://www.el.net/CAT>

Offers assistive technology articles and reviews of software and hardware in full text, information on adapting web browsers, and a listing of online disability resources.

Center for Applied Special Technology (CAST)

<http://www.cast.org>

Features projects developed at CAST's National Universal Design Laboratory; provides a link to *Bobby*, its HTML analyzer, that will check a website's accessibility; and has links to resources such as writing accessible HTML.

Center for Computer Assistance to the Disabled, Inc. (C-CAD)

<http://www.c-cad.org>

Includes links to disability sites, a computer training catalog, and demonstration adaptive software that can be downloaded.

Center for Information Technology Accommodation (CITA)

<http://www.itpolicy.gsa.gov/coca/index.htm>

Has the handbook *Managing information resources for accessibility* and full-text papers on topics such as writing accessible HTML code and universal access.

CPB/WGBH National Center for Accessible Media (NCAM)

<http://www.boston.com/wgbh/pages/ncam>

Establishes design strategies for incorporating accessibility features into emerging telecommunications such as the World Wide Web.

Electronic Industries Association and Electronic Industries Foundation

<http://www.eia.org/eif/toc.htm>

Presents the *Resource guide for accessible design of consumer electronics*.

Equal Access to Software and Information (EASI)

An affiliate of the American Association for Higher Education

<http://www.rit.edu/~easi>

Includes information on adaptive hardware and software resources, adaptive technology publications, and designing web pages for universal design.

International Business Machines and Sun Microsystems

<http://www.ibm.com/sns> and <http://www.sun.com>

Describes the collaboration of IBM and Sun Microsystems to make Java accessible.

Microsoft Corporation

<http://www.microsoft.com/enable>

Presents Microsoft's accessibility products and applications.

NCSA (National Center for Supercomputing Applications) Mosaic Access Page

<http://bucky.aa.uic.edu>

Has information on access methods by disability, access methods by operating system, and resources including list servers and funding assistive technology.

Starling Access Services

<http://www.igs.net/~starling/starling.htm>

Has a guide *Accessible web page design* and links to sites about HTML accessibility.

Trace Research and Development Center

<http://trace.wisc.edu>

Establishes principles and guidelines for universally designed products. Develops resources to help integrate access features into information technologies.

Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C)

<http://www.w3.org/WAI>

Has resources on web accessibility, including a working draft of *WAI accessibility guidelines: page authoring*.

WebABLE! A project of the Yuri Rubinsky Insight Foundation

<http://www.yuri.org/webable>

Provides links to hundreds of internet resources on disabilities and accessibility.

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